

We claim:

1. An apparatus useful in placing bone grafts in a spine of a patient,
comprising:

a cervical plate;

the cervical plate having a top side and a bottom side;

at least one attachment mechanism;

the at least one attachment mechanism coupled to the bottom side of the
cervical plate; and

5 the attachment mechanism for coupling at least a first bone graft to the
cervical plate prior to insertion of the first bone graft into an intervertebral
space,

wherein prior to attaching the cervical plate to at least one vertebrae, the
cervical plate is held in place by adjacent vertebrae squeezing the first bone

10 graft.

2. The cervical plate according to claim 1, wherein the at least one
attachment mechanism comprises at least one protrusion.

3. The cervical plate according to claim 1, wherein the attachment
mechanism is fusion of at least one bone graft to the cervical plate to form one
integrated unit.

4. The cervical plate according to claim 1, wherein the at least one
attachment mechanism comprises at least one detent adapted to receive at least
one corresponding protrusion.

5. The cervical plate according to claim 1, wherein the at least one attachment mechanism comprises at least one of a screw, an adhesive, a nail, and a plurality of prongs.

6. The cervical plate according to claim 1, wherein the cervical plate comprises biocompatible material.

7. The cervical plate according to claim 6, wherein the biocompatible material is bio absorbable material.

8. A cervical plate with a screw back out prevention device, comprising:
- a cervical plate;
 - the cervical plate having at least one screw hole through which at least one screw extends to anchor the cervical plate to a vertebra;
 - the cervical plate having at least one channel with at least one engaging edge;
 - a cover plate having at least one plate edge, the at least one plate edge extends over a portion of a screw head of the at least one screw;
 - the cover plate having a locking extension with at least one locking edge at a distal end of the locking extension, wherein the cervical plate is attached to the vertebra using the at least one screw and the locking extension is inserted into the channel such that the at least one engaging edge and the at least one locking edge engage and hold the cover plate such that the at least one plate edge of the cover plate is substantially adjacent the portion of the screw head of the at least one screw to prevent the at least one screw from backing out.
9. The cervical plate according to claim 8, wherein the cover plate comprises a shape, the shape comprising at least one of a polygonal shape, a circular shape, an elliptical shape, a letter shape, a linear shape, an arc shape, a zigzag shape, a convex shape, and a concave shape.
10. The cervical plate according to claim 8, wherein the at least one engaging edge is a lip and the at least one locking edge is a shoulder.

11. The cervical plate according to claim 8, wherein
the locking extension comprises a plurality of prongs coupled to the cover plate and extending from the cover plate in an inverted V shape, each of the plurality of prongs having the at least one locking edge at the distal end; and
the cover plate comprises at least one access port,
such that a tool can be inserted through the at least one access port to squeeze the plurality of prongs together to allow the locking edge of each of the plurality of prongs to fit into the at least one channel,
wherein when the tool is removed, the prongs separate and the at least one locking edge engages the at least one engaging edge.

12. The cervical plate according to claim 8, wherein the locking extension comprises,
a plurality of prongs coupled to the cover plate and extending from the cover plate in an inverted V shape, each of the plurality of prongs having the at least one locking edge at the distal end, the at least one locking edge having a wedge shaped extension, such that while inserting the locking extension into the channel, the at least one engaging edge and the wedge shaped extensions cause the prongs to squeeze together wherein prongs separate when the wedge shaped extension moves beyond the at least one engaging edge causing the plurality of prongs to move apart such that the at least one locking edge engages the at least one engaging edge.

13. The cervical plate according to claim 8, wherein the at least one engaging edge is formed from at least one hollow in the channel.

14. The cervical plate according to claim 13, wherein the at least one locking edge is a protrusion formed on the locking extension.

15. The cervical plate according to claim 14, wherein the protrusion is an elastically-loaded pin.

16. The cervical plate according to claim 8, wherein the at least one engaging edge is a protrusion in the channel.

17. The cervical plate according to claim 16, wherein the at least one locking edge is a hollow formed on the locking extension.

18. A cervical plate with a screw back out prevention device, comprising:

a cervical plate;

the cervical plate having at least one screw hole through which at least one screw can be threaded to anchor the cervical plate to a vertebra;

at least one locking bar slidably coupled to the cervical plate;

the at least one locking bar having a locking edge, the at least one locking bar having at least a first position and at least a second position, in the first position the locking edge does not engage a screw head of the at least one screw and in the second position the locking edge engages the screw head of the at least one screw; and

at least one locking stud coupled to the at least one locking bar to secure the at least one locking bar in the second position, such that

when the at least one locking bar is in the first position, the at least one screw can be unthreaded and when the at least one locking bar is in the second position, the at least one screw is inhibited from unthreading by the at least one locking bar.

19. The cervical plate according to claim 18, wherein at least one locking stud comprises at least one of a screw, a nail, a pin, a cam, and a bolt.

20. The cervical plate according to claim 18, wherein the at least one locking bar extends a length of the cervical plate.

21. A screw back out prevention device for use with cervical plates to inhibit bone screws from backing out, the prevention device comprising:

a bushing;

the bushing having an inner edge forming a gap through which a screw can be threaded;

at least one elastically-loaded pin;

the bushing resides between the head of the screw and the cervical plate such that the at least one elastically-loaded pin engages the screw when the screw is threaded to inhibit the screw from backing out.

22. The screw back out prevention device according to claim 21, wherein the elastically-loaded pin engages at least one thread of the screw.

23. The screw back out prevention device according to claim 21, wherein the elastically-loaded pin engages at least one notch in the screw.

24. The screw back out prevention device according to claim 23, wherein the at least one notch is located in a head of the screw.

25. The screw back out prevention device according to claim 21, wherein the at least one elastically-loaded pin comprises a plurality of elastically-loaded pins.

26. The screw back out prevention device according to claim 21, further comprising at least one channel in the bushing corresponding to the at least one elastically-loaded pin, wherein a portion of the elastically-loaded pin resides in the at least one channel.

27. The screw back out prevention device according to claim 26, further comprising at least one spring between the busing and the at least one elastically-loaded pin.

28. The screw back out prevention device according to claim 27, wherein the at least one spring comprises a helical spring.

29. The screw back out prevention device according to claim 27, wherein the elastically-loaded pin has elastic movement caused by at least one of pneumatics, magnetics, and shaped memory alloys.

30. A back out prevention device for a cervical plate, the prevention device comprising:
a bushing;
a screw; and
at least one bonding material, wherein
the bushing having an inner sidewall, the at least one bonding material residing on at least one portion of the inner sidewall, wherein
the screw comprises a screw head and a shank, wherein
the screw head having an outer sidewall, the at least one bonding material residing on at least one portion of the outer sidewall, wherein
when the screw is threaded into a vertebral body, the at least one bonding material on the at least one portion of the inner sidewall substantially aligns with the at least one bonding material on the at least one portion of the outer sidewall forming a bond that inhibits the screw from backing out.

31. The screw back out prevention device according to claim 30, wherein the bonding material is a self-bonding material.

32. The screw back out prevention device according to claim 30, wherein the bonding material is at least one of a thermally activated bonding material, pressure activated bonding material, an electrically activated bonding material, and a radiation activated bonding material.

33. The screw back out prevention device according to claim 30, wherein the bonding material is at least one of an epoxy, an acrylics, a resin, a silicone, an adhesive, a glue, and a tape.

34. The screw back out prevention device according to claim 31, wherein the at least one self bonding material is in a form of a washer and the at least one self bonding material resides in a first notch on the inner sidewall and a second notch on the outer sidewall.

35. The screw back out prevention device according to claim 31, wherein the at least one self bonding material is coated on the inner sidewall and the outer sidewall.

36. A back out prevention device for a cervical plate, the prevention device comprising:

- a screw hole in a cervical plate;
- a screw; and
- at least one bonding material, wherein

the screw hole having an inner sidewall, the at least one bonding material residing on at least one portion of the inner sidewall, wherein

- the screw comprises a screw head and a shank, wherein

the screw head having an outer sidewall, the at least one bonding material residing on at least one portion of the outer sidewall, wherein

when the screw is threaded into a vertebral body, the at least one bonding material on the at least one portion of the inner sidewall substantially aligns with the at least one bonding material on the at least one portion of the outer sidewall forming a bond that inhibits the screw from backing out.

37. The screw back out prevention device according to claim 36, wherein the bonding material is a self-bonding material.

38. The screw back out prevention device according to claim 36, wherein the bonding material is a thermally activated bonding material, a pressure activated bonding material, an electrically activated bonding material, and a radiation activated bonding material.

39. The screw back out prevention device according to claim 36, wherein the bonding material is at least one of an epoxy, an acrylic, a resin, a silicone, an adhesive, a glue, and a tape.

40. The screw back out prevention device according to claim 37, wherein the at least one self bonding material is in a form of a washer and the at least one self bonding material resides in a first notch on the inner sidewall and a second notch on the outer sidewall.

41. The screw back out prevention device according to claim 37, wherein the at least one self bonding material is coated on the inner sidewall and the outer sidewall.

42. A cervical plate having a screw back out prevention device, comprising:
a cervical plate;
at least one ridge coupled to a surface of the cervical plate;
at least one cover; and
the at least one cover having at least one groove corresponding to the at least one ridge and at least one peripheral edge, such that
when installed the at least one groove and at least one ridge form a fitting and the at least one peripheral edge extends over at least one screw head to inhibit back out.

43. The cervical plate according to claim 42, wherein the cover plate comprises a shape, the shape comprising at least one of a polygonal shape, a circular shape, an elliptical shape, a letter shape, a linear shape, an arc shape, a zigzag shape, a convex shape, and a concave shape.

44. The cervical plate according to claim 42, wherein the at least one ridge has at least one lip and the at least one groove has at least one corresponding shoulder such that the at least one lip and the at least one shoulder abut form a snap lock fitting.

45. A cervical plate with a screw back out prevention device,
comprising:

- a cervical plate;
- at least one screw hole in the cervical plate through which at least one screw is threaded to anchor the cervical plate to a vertebra; and
- means for inhibiting the backing out of the at least one screw.

46. The cervical plate according to claim 45, wherein the means for inhibiting comprises:

- at least one channel in a surface of the cervical plate;
- at least one cover plate having an edge that extends over the at least one screw; and

- at least one locking extension coupled to the at least one cover plate,

wherein

- the at least one locking extension comprises at least one prong that extends from the at least one cover plate into the at least one channel forming forms a fitting with the at least one channel.

47. The cervical plate according to claim 45, wherein the means for inhibiting comprises:

- at least one movable bar having a first position allowing the at least one screw to be threaded and a second position inhibiting the at least one screw from being threaded;

- the movable bar slidably coupled to the cervical plate; and

- a locking device comprising at least one of a pin, a screw, a bolt, a magnet, a cam, and a clip connected to the cervical plate and the at least one movable bar locking the at least one movable bar in the second position.

48. The cervical plate according to claim 45, wherein the means for inhibiting comprises:

at least one bushing formed to be threaded on the at least one screw; and
an elastically-loaded locking pin coupled to the bushing and extending radially inward, wherein the locking pin has a frictional engagement with the at least one screw inhibiting the at least one screw from backing out.

49. The cervical plate according to claim 45, wherein the means for inhibiting comprises a bonding material.